United States Department of Agriculture
Forest Service
Southwestern Region
Forest Health
Arizona Zone Office
2500 S. Pine Knoll Drive
Flagstaff, AZ 86001-6381
FAX (928) 556-2130
Voice (928) 556-2073

File Code: 3420
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Pete Hutchinson
Praying Mantis Termite & Pest Control
1260 South Highway 89
Unit C
Chino Valley, AZ 86323

Dear Mr. Hutchinson:

At your request, John Anhold (Zone Leader, Arizona Zone Forest Health) and I visited piñon-juniper woodlands along and adjacent to Williamson Valley Road west of Chino Valley on March 12, 2007. You had observed piñon pine mortality and damage throughout the area and wanted us to determine their causes. I describe in this letter what damage was observed in these areas, general existing tree conditions, and treatments to minimize future impacts.

In addition to conducting road side surveys of tree damage and mortality along Williamson Valley Road, we visited two subdivisions for closer observations: Cross Roads Canyon Ranch and Talking Rock Ranch. It was apparent from driving along Williamson Valley Road between the Outer Loop Road and Talking Rock that many piñon had thin crowns and looked in poor shape.

Cross Roads Canyon Ranch subdivision.

Scattered pockets of piñon mortality were observed throughout this area. We stopped at an area off of W. Dillon Wash Road to examine some of these trees. Both piñon currently infested with pinyon ips (*Ips confusus*) and previously attacked trees were found (***Figure 1***). The needles on trees currently under attack were just beginning to fade from green to an olive-yellow color. Removal of bark from these trees found beetles actively constructing egg galleries as indicated by the characteristic Y- or H-shaped galleries (***Figure 2***). Trees previously attacked by ips had completely faded needles (reddish-brown color), which were beginning to fall from trees. Overwintering feeding galleries and old egg galleries were found by removing the bark from these trees.

Figure 1. *Piñon currently infested by pinyon ips (left) and previously attacked trees (right).*

Talking Rock Ranch subdivision.

Similar to Cross Roads Canyon Ranch, scattered pockets of piñon mortality were seen throughout this subdivision. Factors contributing to the ips-caused mortality of piñon in this area are the new construction and dense stand conditions caused by heavy regeneration of junipers. Also, we observed piling of recently felled piñon and junipers. This material can serve as host material for brood production by pinyon ips and juniper bark beetles, respectively. From this material beetles can emerge and attack adjacent green host trees.

In addition, high levels of pinyon needle scale (*Matsucoccus acalyptus*) were observed on many piñon in this subdivision and along Williamson Valley Road (***Figure 3***). This insect causes piñon to have sparse looking crowns with often only one age class of needles present. Needle scale typically will not kill a tree. No direct relationship has been found between needle scale infestation and tree susceptibility to pinyon ips attack.

Figure 2. *Pinyon ips egg gallery (left) and overwintering feeding gallery (right).*

Pinyon ips biology and description.

All life stages of ips are found in the inner bark except for when adults emerge and fly to attack a new tree. They typically attack medium to large sized piñon and infest the main trunk and larger branches. Adult beetles are about ¼ inch in length and shiny black to rust brown in color. The larvae (grubs) are white, legless, c-shaped, and less than ¼ inch in length. This species of beetle can have 2 or more generations per year. They spend the winter in feeding galleries beneath the bark generally in the lower portion of the trunk.

Large-scale outbreaks of pinyon ips are triggered by moderate to severe extended periods of drought. Their outbreaks are usually short-lived lasting only 1-3 years. High tree density and infection by pinyon dwarf mistletoe (*Arceuthobium divaricatum*) can exacerbate these outbreaks.

Figure 3. *Piñon infected with pinyon needle scale.*

Treatments for preventing pinyon ips attacks and impacts.

1. *Prevention*. As indicated in the publication by DeGomez and Celaya (2006), prevention is usually the best way to reduce losses due to pinyon ips. Healthy, vigorous trees usually are not attacked unless there is a large outbreak. Trees injured during construction activities, including excavation, paving, and earth fills, cause soil compaction and trunk wounds that stress trees and make them more susceptible to bark beetle attack. Large, transplanted trees are typically under severe stress and can be highly susceptible to attack. Reducing tree density will also increase tree vigor by decreasing inter-tree competition for moisture, light, and nutrients. This can have long-term positive effects in preventing future attacks.

2. *Identification and removal of currently infested trees*. Trees currently infested with pinyon ips are identified by fading needles over most of the crown of the tree, boring dust (resembles fine sawdust that is a reddish color) in the bark crevices and around the base of trees, and pitch tubes (½ inch diameter wads of rust-colored pitch) on the trunk and larger branches. Just cutting infested trees down will not kill the developing brood. This material needs to be removed from the site (>2 miles from susceptible piñon) or treated on site in some way (chipped, burying, burned or peeled). Treating previously attacked trees (needles completely faded and falling off the tree) is not necessary from a beetle control strategy as developed brood will have already emerged and flown to new host trees.

3. *Preventative insecticide treatments*. These treatments are generally only recommended for high-value trees and when there are high enough populations of bark beetles to threaten these trees. Trees weakened by construction activities are especially vulnerable while populations are moderate to high (as indicated by observable levels of active tree mortality). Application of EPA-approved insecticides labeled for bark beetles (carbaryl, permethrin) should be applied only to trees not currently under attack. Spraying trees already under attack will not save them.

We recommend contacting your local county extension agent (Jeff Schalau) or the state forest health specialist (Bob Celaya) for additional assistance in carrying out the above listed treatments.

If you have any questions regarding my assessment within these areas, please call me at (928) 556-2074.

Sincerely,

/s/ Joel D. Mcmillin
JOEL D. McMILLIN, Ph.D.
Entomologist, Forest Health, Arizona Zone

cc: Jeff Schalau
Bob Celaya
Mike R Williams
John Anhold
Debra Allen-Reid

References Cited

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